

CLAIMS

1. A motorized valve actuator wherein the drive from the motor to the output shaft of the actuator is via a gear mesh which is incapable of being back driven, the actuator having an alternative manual drive, the manual drive comprising a hand wheel and a clutch and lever to change from motor power drive to hand drive mode, the actuator further having an intermediate shaft between the motor and output shaft, the hand wheel being carried by or at least operatively linked to the intermediate shaft to drive the intermediate shaft, characterized in that the intermediate shaft is positioned between the motor and the gear mesh whereby when the lever is operated to bring the actuator into hand drive mode the clutch mechanism operates substantially freely, the output shaft torque generated by the previous motor powered run and locked into the output shaft by the non-back driving gear mesh not being locked into the clutch mechanism.
2. A motorized valve actuator as claimed in Claim 1, wherein the non back driveable gear mesh comprises a worm and worm wheel assembly.
3. A motorized valve actuator as claimed in Claim 1, wherein the clutch mechanism is associated with/ mounted on the intermediate shaft.
4. A motorized valve actuator as claimed in Claim 1, wherein the actuator has a gear reduction drive associated with the intermediate shaft.
5. A motorized valve actuator as claimed in Claim 1, wherein at least one of the hand wheel, lever and one or more clutch components is formed as a plastics molding.
6. A motorized valve actuator as claimed in Claim 1, wherein the clutch comprises a moving clutch member and a co-operating clutch operator having co-operating conical surfaces.
7. A motorized valve actuator as claimed in Claim 6, wherein the sliding conical surfaces on the moving clutch member and the clutch operator are configured with the clutch operator's conical surface wrapping at least partially around the moving clutch member's conical surface so that there is substantial area contact at the start of a de-clutching operation, the area rapidly diminishing towards a line contact as the clutch moving member rises to the hand drive position.
8. A motorized valve actuator as claimed in Claim 6, wherein the actuator has a rotating cam member that is driven by the lever and which cooperates with the

clutch operator in order to vary the mechanical advantage between the lever movement and the moving clutch member via the sliding conical surfaces.

9. A motorized valve actuator as claimed in Claim 1 wherein the lever's pivot7ting axis is positioned parallel and adjacent to the hand wheel's rotation axis.
- 5 10. A motorized valve actuator as claimed in Claim 9, wherein the lever has a curved shape and is configured to swing underneath the hand wheel circular periphery and partly surround the hand wheel axle.
11. A motorized valve actuator as claimed in Claim 1, wherein the actuator further comprises a latch member to latch the clutch in engagement for hand drive.
- 10 12. A motorized valve actuator as claimed in Claim 11, wherein the latch member is provided with teeth, which teeth engage with teeth of a gear wheel of the drive train of the actuator to latch the actuator in its hand drive state, thereby providing a positive engagement when in hand drive mode and a positively driven disengagement operation when returning to power drive mode.
- 15 13. A motorized valve actuator as claimed in Claim 12, wherein the gear wheel is driven by the motor and associated with/ mounted on the intermediate shaft, the gear wheel, by operation of the clutch, being selectively engageable with the intermediate shaft to drive the intermediate shaft.
- 20 14. A motorized valve actuator as claimed in Claim 11, wherein the latch member is pivoted and has adjacent thereto a flat spring means with which the latch member co-operates, the flat spring means serving in one state to bias the latch member to pivot toward its hand drive engaged latch position.
- 25 15. A motorized valve actuator as claimed in Claim 14, wherein the latch member is provided with a faceted boss and which boss co-operates with the flat spring means so that in a "trailing" disengaged position the latch member is positively held out of contact with the member with which it otherwise engages in its hand drive engaging latch position.
- 30 16. A motorized valve actuator as claimed in Claim 11, wherein the latch mechanism of the actuator further comprises at least one static post relative to which the latch member is moved as the lever is operated in order to pivot the latch member positively from a "trailing" position substantially into the latched position.
17. A motorized valve actuator as claimed in Claim 16, wherein the latch mechanism has a pair of spaced apart static pegs between which the latch member is

moved as the lever is operated in order to rotate the latch member positively from either of two "trailing" positions substantially into a central latched position.

18. A motorized valve actuator as claimed in Claim 1, the clutch comprising a moving clutch member, the intermediate shaft having pinion gear teeth to co-operatively engage with a co-operating gear of a shaft for driving the worm/ worm wheel, the intermediate shaft further having splines that cooperate with the moving clutch member whereby the moving clutch member is slidable longitudinally of the intermediate shaft but rotates therewith, wherein the pinion gear teeth are extended longitudinally of the intermediate shaft whereby the splines are formed of the longitudinal extensions of the pinion gear teeth.

19. A motorized valve actuator as claimed in Claim 16, wherein the longitudinal extensions of the pinion gear teeth on the intermediate shaft are cut back to a reduced diameter.

15 20. A motorized valve actuator of the type having an alternative manual drive, the manual drive comprising a hand wheel and a clutch and lever to change from motor power drive to hand drive mode, wherein the actuator comprises a latch member to latch the clutch in engagement for hand drive or motor drive, the latch member being provided with teeth which engage with teeth of a gear wheel of the drive train of the actuator in order to provide a positive engagement when in hand drive mode and a 20 positively driven dis-engagement operation when returning to power drive mode.

21. A motorized valve actuator of the type having an alternative manual drive, the manual drive comprising a hand wheel and a clutch and lever to change from motor power drive to hand drive mode, wherein the actuator comprises a latch member to latch the clutch in engagement for hand drive or motor drive, the latch member being deflected to turn to its latched hand drive position by a fixed post relative to which the lever is moved, a spring means being provided adjacent to the latch member to bias the latch member to turn more fully into its hand drive engaged latched position.